System Test Phase 0.1 Report
for the Radiosonde Replacement System (RRS)

INTRODUCTION

The National Weather Service (NWS) will transition from the current radiosonde system to the RRS to collect and process upper air data using modern technology. The RRS will be nationally deployed after the government successfully completes a series of tests, the last two of which will be the System Test (ST) and the Operational Acceptance Test (OAT).

Just as ST Phase 0, the ST Phase 0.1 served as an extension of developmental testing and was a "dry run" for the formal to document any system problems in System Issue Reports (SIRs) for resolution to optimize a successful, formal ST.

The Office of Operational Systems, Field Systems Operations Center, Test and Evaluation Branch (OPS24) conducted the ST Phase 0.1, for the RRS with analytical support from OPS11, OPS22, and OS7. The ST Phase 0.1 began on November 12, 2003 and ended on December 19, 2003, as planned. This report documents the test results and recommendations of ST Phase 0.1.

OBJECTIVES

The objectives of the RRS ST Phase 0.1 were to:

a.   Verify the RRS installation instructions were complete and accurate.

b.   Validate OPS24 RRS Test Procedures which address all RRS Workstation Subsystem (RWS) System Requirement Specification (SRS) requirements.

c.   Verify solo "live" flight and launch procedure processes.

d.   Determine the maturity state of the RRS.

e.   Determine the status of the draft user and technical documentation.

ASSUMPTIONS/CONSTRAINTS

The RRS ST Phase 0.1 was conducted with the following assumptions/constraints:

a.   The RRS ST Phase 0.1 began with outstanding Priority 2 SIRs not implemented in the RWS software. All Priority 1 SIRs were implemented in the RWS test software Build 1.0.3.1.

b.   Only minimal on-site analyses were performed of RWS coded message content.

However, OPS22 and OS7 would perform detailed analysis if any major anomalies were observed on-site.

  c. Only on-site analyses were performed of any World Meteorological Organization (WMO) levels generation and data processing algorithms. Any anomalies observed on-site during RRS ST Phase 0.1 were forwarded to OPS22 and OS7 for detailed analysis.

  d. The on-site Test Team performed basic analysis of the RWS post termination Flight Summary. If any anomalies were observed, all applicable flight data were forwarded to OPS22 and OS7 for detailed analysis.

  e. Since ST Phase 0.1 was more of a developmental testing nature, the process of obtaining spare parts from the National Logistic Supply Center (NLSC) was not tested. This logistic process will be tested during ST Phase IA.

TEST CONDUCT

The RRS ST Phase 0.1 commenced on Wednesday, November 12, 2003, with a ST Phase 0.1 Readiness Review. At the Readiness Review, OPS23 provided OPS24 with RWS software build 1.0.3.1. In addition, cognizant individual certified their respective subsystem either at the Readiness Review or prior to the first live light at the Sterling Research and Development Center (SR&DC). This certification process was not completed until November 19, 2003.

After an initial problem with the OPS23 "ghost imagining process," the RWS software was loaded successfully on the OPS24 RRS test system at National Weather Service Headquarters (WSH) following the Readiness Review. ("Ghost imagining" is a process of replicating the hard drive contents of a computer on another computer for the purpose of synchronizing contents.) Once the RRS hardware certification was completed, the RWS software was loaded uneventfully on the SR&DC RRS Systems 6 and 7 on Thursday, November 20, 2003. Both RRS Systems were used for testing. Refer to Table 1 for SR&DC RRS Systems 6 and 7 test configurations.

After the new software load (1.0.3.1) was installed at the SR&DC, hardware checkout tests were performed on the Telemetry Receiving Subsystem (TRS) and the Signal Processing Subsystem (SPS). Sixty-one tests were subsequently completed on the OPS24 test system at WSH while 57 tests were completed at the SR&DC using RRS Systems 6 and 7.

Different sets of test procedures were performed at each location; however, certain administrative procedures (such as adding new users) were performed at both sites. The OPS24 test system located at the WSH (which consisted of a RWS and an External Data Pump (XDP) - a RRS hardware simulator) was used to verify administrative requirements and to perform tests requiring previously flown flight data to simulate environmental conditions. The SR&DC RRS Systems 6 and 7 were used primarily for those tests requiring "live" flights. All live flights were conducted with Sippican Global Positioning System (GPS) Mark II radiosondes and General

Purpose (GP30) weather balloons.

During live flights the different balloon release methods contained in the Weather Service Observing Handbook (WSOH) 10 (sections 6.13.2.1 and 6.13.2.2) were employed depending on release point and weather conditions. Six different release point locations were used depending on test objective and weather conditions. These six locations were previously recommended by OPS22, agreed to by OPS24, and surveyed by OPS11. These six release point locations are identified in Attachment 1. (Note: Attachment 1 contains the balloon release points identified prior to the start of ST Phase 0.1. The coordinates were re-surveyed and refined during the ST Phase 0.1 to match the precision used by the RWS application.)

An interim RWS software build (0.0.0.62) was installed in SR&DC RRS System 6 on December 3, 2003 by OPS23 for evaluation. One week later, on December 10, 2003, the interim RWS build was installed on the OPS24 test system at WSH and on SR&DC RRS System 7 by OPS24 personnel.

TEST RESULTS

All respective tests were completed on the OPS24 test system and the SR&DC RRS systems. (Attachments 2and 3 list the tests performed at each location.) Where appropriate, tests were conducted with various user accounts (Site Administrator, Observer, or Trainee) to verify only certain functions were allowed for specific user types.

In measuring the state of the RWS software maturity, as of December 23, 102 SIRs were written by the RRS Test Team (composed of representatives from OPS22, OPS24, and OS7) for ST Phase 0.1 as follows: (Note: As of December 23, 2003, this list might not reflect the final adjudication of the RRS Configuration Control Board.)

0	Priority 1 SIRs
78	Priority 2 SIRs
21	Priority 3 SIRs
9	Priority 4 SIRs
0	Priority 5 SIRs

(Note: As of December 23, this list contains 10 SIRs written during post-test analysis.)

Ninety-three of the SIRs were against the RWS software builds; nine SIRs were hardware SIRs. Six of the hardware SIRs were against the Telemetry Receiving Subsystem (TRS); two remaining hardware SIRs were against the Signal Processing System's (SPS) failure to initialize during baseline; and one was against the slowness of the external drive used for backup.

These SIRs are itemized in Attachment 4.

During the ST Phase 0.1, each of the hardware SIRs required maintenance actions by the OPS22

appointed acting Electronic Systems Administrator (ESA).

The main hardware concern for beginning ST Phase IA, is the questionable SPS currently installed in SR&DC RRS System 6. This is the same SPS used during ST Phase 0. This SPS continued, during ST Phase 0.1, to experience the initialization problems reported in the SPS SIRs.

The TRS Motion Control Unit (MCU) firmware version 1.40 of System 6 had a typographical error for the TRS location value. This caused the TRS to have difficulties locking onto the radiosonde. Once this was identified and corrected, the TRS would lock on the radiosonde without any difficulties. The difficulty was a non-deliverable software application, Flight Logger, had to be used to correct the problem. RRS does not contain a method for modifying or uploading MCU firmware.

In addition, both SR&DC RRS Systems 6 and 7's TRS would periodically "lock up" and prohibit any antenna control by the Observer. This will be further analyzed by OPS11.

OPS23 recommended as a work-around for the problem with the external drive, to move the external drive's Universal Serial Buss (USB) connector from the rear USB port on the RWS to the front USB port. The front USB port connection uses the 2.0 protocol which is faster than the rear ports that use the 1.0 protocol. OPS23 is still analyzing the problem for a final solution.

CONCLUSIONS

ST Phase 0.1 conclusions are supported by the following examination of the original test objectives:

a.   Verify the RRS installation instructions were complete and accurate.

During the first attempt to install the RRS software on the OPS24 test system, a problem was discovered with the ghost image process to "clean" the RWS internal hard drive. Once this was corrected, the RWS software was installed without problems at WSH.   No problems were experienced during the RWS software installation on either SR&DC RRS system.

b.   Validate OPS24 RRS Test Procedures.

All RWS SRS requirements contained in the revised SRS dated October 31, 2003, were tested.

c.   Verify solo "live" flight procedures.

As of December 17, 2003, 53 flights were flown during the RRS ST Phase 0.1--of which 40 were considered valid flights for statistical purposes. A valid flight is defined as one

that was not caused to terminated by the Observer (i.e., by direction, balloon or battery manipulation, etc.). The following results were observed:

1. Of the 40 valid flights, 39 (97.5%) reached 400 hPa and of those, 15 (38.7%) reached 10.00 hPa or less

2. The most frequent reasons reported by the RWS for flight termination were (with the number of related flights in parentheses):

Balloon Burst (8)
Leaking or Floating Balloon (18)
Excessive Missing Data (15)
Excessive Missing Temperature Data (7)

3. During five flights the Observer was directed to terminate the flight early when specific test objectives were met. The RWS correctly reported the reason as "Observer chose to terminate."

4. Beginning on December 5, 2003, the RRS Test Team was directed by WSH management to begin analyzing the flight data to determine if the RWS application was correctly identifying the proper flight termination reason. The following results are reported:

a) On December 5, 2003, both SR&DC RRS System 6 and 7 identified the termination reason as "leaking or Floating Balloon"; the Observer's analysis showed "Balloon Burst." System 7 had RWS Build 1.0.3.1 loaded; System 6 had RWS interim Build 0.0.0.62 loaded.

b). On the first flight flown on December 15, System 7's RWS reported "Excessive Missing Temperature Data" as the termination reason; the Observer's analysis was simply "Excessive Missing Data." System 7 had RWS interim Build 0.0.0.62 loaded. System 6 was not used to track this flight as it was being used for other testing at the time.

c) On the second flight flown on December 15, System 7's RWS reported the termination reason as "leaking or Floating Balloon"; the Observer's analysis showed "Balloon Burst." System 7 had RWS interim Build 0.0.0.62 loaded.

The individual flight summary logs documenting each flight for SR&DC RRS Systems 7 and 6 are contained in Attachments 5 and 6, respectively. (Note: These flight summary logs are not the same as the Flight Summary created by the RWS after each flight.)

Using the launch procedure specified in WSOH-10 [Section 6.13.2.2 - Antenna positioning with the Control Display Unit (CDU)], one flight was lost on December 15, 2003, when the System 7 TRS failed to lock onto the radiosonde after release. This issue is still under analysis. The launch procedures contained in WSOH-10 will be further refined by OPS22 prior to commencing ST Phase IA.

Five Sippican radiosondes failed "out of the box" (i.e., failed to operate properly during baseline). Surprisingly, all five of the radiosondes failed in the month of December (one on December 1; one on December 5; two on December 12; one on December 17). Two of the radiosondes failed to transmit a signal during baseline; two had missing thermistor solar radiation protection tape; and one had a bad pressure sensor.

d.   Determine the maturity state of the RRS.

One hundred and two new problems were identified during the ST Phase 0.1 by the RRS Test Team (53 more than were found during ST Phase 0); 78 of which were identified as Priority 2. OPS24 requests all Priority 2 RWS software problems be fixed prior to start of the ST Phase IA.

The RWS does not properly process "descending/ascending" balloon conditions and creates very high (i.e., values over 5000) superadiabatic lapse rate check messages.

The post termination Flight Summary and the offline Flight Summary Utility often do not contain values supported by the WMO Levels Display or the Processed Tabular Display.

e.   Determine the status of the draft user and technical documentation.

It was observed there were no adequate troubleshooting procedures or tools available to the OPS22 ESA. All troubleshooting was performed using past experience on similar systems. User documentation appeared adequate to perform RRS operations.

RECOMMENDATIONS

Based on the review of the RRS ST test results and conclusions, OPS24 is recommending the following items be addressed prior to a start of the ST Phase IA:

a.   Inadequate definition of SIR priorities to cover operational concerns. The phrases [Priority 1] "... preventing the accomplishment of mission essential capabilities ...." and [Priority 2] "... adversely affecting the accomplishment of a mission essential or technical capability ...." need to be clarified. OPS24 will work with OPS23 and OS7 to develop more meaningful SIR definitions.

b.   Lack of any RRS detailed troubleshooting procedures (including troubleshooting flow charts). These need to be finalized by OPS11/OPS12 prior to ST Phase IA.

c.   Procedures for radiosonde preparation, balloon launch, pre-flight, and baseline for both SR&DC RRS Systems 6 and 7 should be refined prior to the start of ST Phase IA.

d.   During ST Phase 0, OPS23 provided an on-site QSS person at the SR&DC to witness live flights and to answer software questions for duration of the test. This support was very useful and minimized the Test Team submitting duplicate SIRs. However, OPS23 did not provide the same support during ST Phase 0.1. OPS24 recommends OPS23 continue to provide an on-site QSS person at the SR&DC during ST Phase IA.

e.   OPS24 recommends OPS11 and OPS12 finalize RRS troubleshooting flow charts prior to ST Phase IA.

f.   The current version of the Offline Maintenance Suite (OMS) lacks the capability to download TRS firmware updates. This represents a serious deficiency for field personnel expected to maintain the RRS. However, an interim version of the OMS Offline Built-In-Test (OBIT) does have this capability and only requires OPS11 approval for official delivery. OPS24 recommends OPS11 approve the interim OBIT version prior to beginning ST Phase IA.

g.   OPS24 further recommends OPS12 include the OPS22/OPS24 maintenance comments (provided to OPS12 by e-mail dated November 24, 2003) in Engineering Handbook 9-901.

h.   OPS24 recommends using a different SPS in System 6 for the ST Phase IA while the questionable SPS is analyzed by Sippican.

i.   OPS24 further recommends using the latest TRS MCU version with the fix(es) identified during the ST Phase 1A.

Table 1 - RRS Systems 6 and 7 Configuration for ST Phase 0.1

RRS Subsystem	Subsystem Line Replaceable Unit (LRU)	Version at End of ST Phase 0	Version at Start of ST Phase 0.1
RRS Workstation Subsystem Software		**1.0.3.0***	**1.0.3.1* ** **
Telemetry Receiving Subsystem (TRS) - Serial Number: 006 (System 6) and 007 (System 7)			
	System Communications Assembly	**V1.25***	**V1.26***
	Motion Control Unit	**V1.37K***	**V1.40***
	Scanner	V2.0.Q	V2.0.Q
	Receiver	V2.08	V2.08
	Console Display Unit	**V3.25***	**V3.26***
Signal Processing Subsystem (SPS) - Serial Numbers: 024203 (System 6) and 030602 (System 7)			
	Firmware	V2.4	V2.4
RRS Surface Observation Information Subsystem (RSOIS) - Serial Number: 1973			
	Remote Processing Unit	V1.952-2178-1.1	V1.952-2178-1.1
	Temperature/Humidity Unit	Vaisala/Handar HMP45DU	Vaisala/Handar HMP45DU
	Aspirator	R. M. Young 43408F-12	R. M. Young 43408F-12
	Wind Sensor	Vaisala/Handar 425AHW	Vaisala/Handar 425AHW
	Base Station	Not use because of fiber optic cable	
	Directional Antenna	Not use because of fiber optic cable	
Precision Digital Barometer (PDB) - Model PDB1 - Serial Number: 177			
RRS Workstation Subsystem (RWS) - Gateway E-6000 - Serial Number: 0029662473			
	Equinox Card	Model 950357-001 Serial number UT06880	Model 950357-001 Serial number UT06880

* Bolding denotes differences between ST Phase 0 and ST Phase 0.1 software/firmware versions.

** An interim RWS build, 0.0.0.62, was installed on System 6 on December 3; at NWSH and System 7 on December 10.

SR&DC Balloon Release Points
(Points and Coordinates used at the Start of ST Phase 0.1)

WGS84 - Geographical Coordinates

Point #	Latitude	Longitude	WGS-84	Geoid Height (m)	4 feet (1.2192 m) Above MSL Height (m)	Center Point of the TRS (m) 49.2 inches (1.24968 m)	Release Point Pressure Correction
1	N 38˚58'36.04033" (38.976677869)	W 77˚28'37.12633"	50.685	33.12	85.0242	NA	0.6
2	N 38˚58'37.97226" (38.97721451)	W 77˚28'37.30152" (-77.4770282)	54.823	33.12	87.943 Top of snout of TRS straight up	86.69332	NA
3	N 38˚58'37.91745" (38.977199291)	W 77˚28'37.80453" (-77.477167925)	51.553	33.12	85.8922	NA	0.5
4	N 38˚58'38.01504" (38.9772264)	W 77˚28'36.80257" (-77.476889602)	51.167	33.12	85.5062	NA	0.5
5	N 38˚58'41.65919" (38.978238663)	W 77˚28'38.04166" (-77.47723379)	56.074	33.12	89.194 Top of snout of TRS straight up	87.94432	NA
6	N 38˚58'41.5818" (38.9782171)	W 77˚28'38.54345" (-77.477373180)	54.742	33.12	89.0812	NA	0.1
7	N 38˚58'41.67575" (38.978243263)	W 77˚28'37.53846" (-77.4770940)	52.093	33.12	86.4322	NA	0.4
8	N 38 58 42.28506" (38.97841251)	W 77 28 36.20347" (-77.476723186)	52.502	33.12	86.8412	NA	0.4
USNO	N 38˚55'08.26460"	W 77˚03'58.40494"	48.878	33.12	81.998	NA	NA
BLDG 16 Baseline Stand	NA	NA			89.89908	NA	NA

Notes:

Height of the GPS egg above the center point of TRS 6 is 84 inches (2.1336 m)
Height of the GPS egg above the center point of TRS 7 is 82 inches (2.0828 m)

Point 1: Launch point (ground level) at the 10 meters east of the highbay. Marked by orange paint on the ground.

Point 2: The center of the end plate of the TRS #7 scanner assembly with the TRS at 0 degrees azimuth and 90 degrees elevation. (can be corrected to TRS point of rotation if horizontal and vertical offsets are known)

Point 3: Launch point (ground level) 10 meters west of TRS #7. Marked by wood stake in ground.

Point 4: Launch point (ground level) 10 meters east of TRS #7. Marked by wood stake in the ground.

Point 5: The center of the end plate of the TRS #6 scanner assembly with the TRS at 0 degrees azimuth and 90 degrees elevation. (can be corrected to TRS point of rotation if horizontal and vertical offsets are known)

Point 6: Launch point (ground level) 10 meters west of TRS #6. Marked by wood stake in ground.

Point 7: Launch Point (ground level) 10 meters east of TRS #6. Marked by wood stake in ground.

Point 8: Launch Point approximately 100 feet northeast of TRS #6.

-USNO is the U.S. Naval Observatory CORS site used for the processing.

NWSHQ
RRS System Test Phase 0.1 Checklist
November 12 - December 19, 2003
(User Accounts: A = Administrator; O = Observer; T = Trainee)

#	Test No	Title	User Account	Data Set	Comments	Initials	Test Date
		000 Series - Installation					
1	001	RRS Installation	A	N/A		HT	11/13/03
		200 Series - System Administration					
2	201	Tools File and Directory	A	N/A		HT	11/14/03
3	211	Flight Management - NCDC Archive Utility	A	N/A		HT	11/17/03
4	212	Flight Management - Flight Import and Export Utility	O/A	N/A		HT	11/17/03
5	214	Flight Management - Flight Deletion Utility	A	N/A		HT	11/17/03
6	215	Flight Management - Flight Summary Utility	O	N/A		HT	11/18/03
7	220	Application Utility	A	N/A		HT	11/18/03
8	221	Application - Plots Utility	A	N/A		HT	11/18/03
9	231	Administration - User Administrative Utility	A	N/A		HT	11/18/03
10	233	Administration - Master Station and Station Data Info	A	N/A		BV	11/19/03
11	234	Administration - Database Backup and Restore Utility	O	N/A		BV	11/19/03
12	235	Administration - File Location Utility	A	N/A		BV	11/19/03
13	236	Administration - Preflight Information Utility	A	N/A		BV	11/19/03
		400 Series -Evaluation of RWS Functional Capabilities					
14	400	GUI Checkout	O	N/A	multiple termination scenarios will be available.	HT	11/20/03
15	401	Nominal Inline Simulator Flight	T	N/A		HT	11/20/03
16	401a	Editing Check Messages	O	N/A		HT	11/21/03
17	402	Nominal Flight - XDP	O	N/A		HT	11/21/03

#	Test No	Title	User Account	Data Set	Comments	Initials	Test Date
18	402a	Nominal Flight - Plots Overlay	O	N/A		HT	11/21/03
19	404	Flight Rework Capability	O	N/A		HT	11/24/03
20	405	Special Flight Release Functions	A/O	N/A		BV	12/10/03
		410 Series - Data Quality and Check Messages					
21	410a	Check Messages for SRS 5.1.2.6.1, 6.7.2.9.1, and 6.7.2.9.2	O	1133.mal 69102-3-1083	Test#410 CD	HT	11/24/03
22	410b	Missing Mandatory Pressure Level and Temperature Lapse Rate	O	1667frz3.mal		HT	11/24/03
23	410c	Data Missing Near Possible Tropopause and Same Pressure At Times	O	69102-3-1071	Test#410 CD	BV	11/25/03
24	410d	No Tropopause Found At 500mb Or Above and No Level Within 20mb of the Surface	O	5007.mal		BV	11/25/03
25	410e	Wind Speed and Direction Changes, and Superdiabatic Lapse Rate detected	O	69102-3-1082	Test#410 CD	BV	11/25/03
26	410f	Wind Speed Exceeds 180kts	O	1039.mal		BV	11/25/03
27	410g	Balloon Descended and Reascended Detected	O	proclc.mal		HT	11/26/03
		430 Series - RRS Anomalous Flight Situations					
28	430a	Missing Winds data	O	1004.mal		HT	11/26/03
29	430b	Excessive Missing data	O	1122.mal		HT	11/26/03
30	430c	Maximum Winds 132kts data	O	1006.mal		HT	11/26/03
31	430d	Maximum Winds 247kts data	O	1039.mal		HT	11/26/03
32	430e	Rapid RH changes	O	1118.mal		SC	11/28/03
33	430f	Temperature less than -80C Degree	O	1095.mal		SC	11/28/03
34	430g	Less Than 250 m/min Ascension Rate	O	1096.mal		SC	11/28/03
35	430h	Floating Balloon	O	1137.mal		HT	12/01/03
36	430i	Constant Pressure at 200 hPa	O	4001.mal		HT	12/01/03
37	430j	Constant Pressure at 600 hPa	O	4004.mal		HT	12/01/03
38	430k	Excessive Missing Pressure Data	O	1148.mal		HT	12/01/03
39	430l	Balloon Burst	O	1290.mal		HT	12/01/03
40	430m	Temperature Inversion Off Surface	O	1613.mal		HT	12/02/03
41	430n	Multiple Super Adiabatic Lapse Rates	O	2183.mal		HT	12/02/03

#	Test No	Title	User Account	Data Set	Comments	Initials	Test Date
42	430o	Failed Temperature Sensor	O	5001.mal		HT	12/02/03
43	430p	Out of Range Temperature Spikes	O	5004.mal		HT	12/02/03
44	430q	Within Range Temperature Spikes	O	5005.mal		BV	12/03/03
45	430r	Seven Freezing Levels	O	1655.mal		BV	12/03/03
46	430s	Negative Pressure Levels	O	4005.mal		BV	12/03/03
47	430t	Out of Range Pressure Spikes	O	4006.mal		BV	12/03/03
48	430u	Within Range Pressure Spikes	O	4007.mal		HT	12/04/03
440 series - RRS Extreme Site Locations							
49	440a	Key West (KHQR), FL	A	1240m.s03		HT	12/04/03
50	440b	Riverton (KHQV), WY	A	1239m.s03		HT	12/04/03
51	440c	Flagstaff (KHQP), AZ	A	1181m.s03		HT	12/04/03
52	440d	Kodiak (KHQS), AK	A	1178m.s03		HT	12/05/03
53	440e	Hilo (KHQQ), HI	A	1237m.s03		HT	12/05/03
54	440f	Pago Pago (KHQT)	A	1226m.s03		HT	12/05/03
55	440g	Yap, WCI (KHQV)	A	1241m.s03		HT	12/08/03
56	440h	Barrow (KHQN), AK	A	1182m.s03		HT	12/08/03
500 Series - Flight Processing and "After Termination" Processing							
57	502	Disk Storage Warning	A			HT	12/08/03
Tests Require Time Changed							
58	402b	Comparison Flight Test	O	N/A		BV	12/10/03
59	410h	Temperature and Height Changes	O	1089.mal 1197.mal		HT	12/09/03
700 Series - Messages Checklist							
60	703	Status Messages Checklist	O	N/A		HT	12/12/03
61	706	Pop-Up Messages Checklist	O	N/A		HT	12/12/03

ATTACHMENT 3

SR&DC System Test Checklist

(Note: User Accounts: A - Site Administrator; O - Observer; T - Trainee)

Test#	TP #	Test Procedure (TP) Title	User Acct	Comments	Init	Date
000 Series - Installation/Hardware Checkout						
20	001	RRS Installation	A	**x2**: Both systems	SC	11/20
21	002	TRS/CDU Remote Operations	A	**x2**: Both systems	SC	11/21
22	003	SPS Communication Status	A	**x2**: Both systems	SC	11/21
23	004	Offline Utility Suite Validation	A	System 7	SC	11/21
200 Series - System Administration						
24	215	Flight Management - Flight Summary Utility	O	System 7 - Data Analysis Req'd	JL	12/17
25	234	Administration - Database Backup and Restore Utility	A	System 7 - Skipped XDP sections	JL	12/17
400 Series -RWS Functional Capabilities						
26	400	GUI Checkout	O	System 6	SC	11/24
27	401	Nominal Inline Simulator Flight	T	System 7	KB	11/24
28	401A	Editing Check Messages	O	System 6	KB	11/21
---	403	Live Flight	O	See: **Live Flight Test Schedule** (page 3)		
10	403A	Antenna Search Mode Test	O	System 7	KB	12/10
30	404	Flight Rework - Station Data Option 1 - Within 6 hours of selected flight	O	Flight imported from Sys 7 into Sys 6 for Rework	KB	12/11
31	404	Flight Rework - Station Data Option 1 - Not within 6 hours of selected flight	O	Flight imported from Sys 7 into Sys 6 for Rework	KB	12/11
32	404	Flight Rework - Station Data Option 2 - Within 6 hours of selected flight	O	System 7	KB	12/12
33	404	Flight Rework - Station Data Option 2 - Not within 6 hours of selected flight	O	System 7	KB	12/12
34	406	RWS In-flight Operations (Stress Test)	O	System 7	SC	12/11
35	413	Product Throughput	O	NA for Phase 0.1		
500 Series - System Back-ups and Recovery						

Test#	TP #	Test Procedure (TP) Title	User Acct	Comments	Init	Date
36	501	System Failure/Recovery	O			
600 Series - Documentation and Training						
37	601	Documentation Review	NA		SC	12/11
38	602	Training	NA		SC	12/11
700 Series - Miscellaneous						
39	701	RRS Flight Data Collection	O	Routine Daily Task		
40	703	Status Messages Checklist	NA		SC	Daily
21a	706	Pop-up Messages Checklist	NA		SC	Daily
22	705	Software Management	NA		SC	12/15
TOTAL NUMBER of TEST PROCEDURES:						24
Total Number of Live Flight Tests:						16
TOTAL NUMBER of TESTS COMPLETED (including Live Flight Tests):						40

Test #	OPS24 FLT #	Date	Test Objective	Release Location/Procedure	Other Test Factors	TP Used Y	TP Used N
23	70021	11/25	S/W: RWS flight termination above 70hPa.	Loc: Release Point 4 Proc: WSOH 10, 6.13.2.1	Also tracked on Sys 6 (60021)	x	
24	60081	12/04	S/W: RWS flight termination above 400hPa and below 70hPa.	Loc: Release Point 1 Proc: WSOH 10, 6.13.2.1			x
25	70091	12/04	S/W: RWS flight termination below 400hPa.	Loc: Release Point 1 Proc: WSOH 10, 6.13.2.1		x	
26	70041	12/01	S/W: Observer flight termination above 70hPa.	Loc: Midway between shelter & Rel Pt 4 (high winds) Proc: WSOH 10, 6.13.2.1	Prior to flight, Flight Logger used to fix TRS 6 location discrepancy (see SIR 1908); Sys 6 acquired & tracked sonde (60041) with no problems.	x	
27	70011	11/24	S/W: Observer flight termination above 400hPa & below 70hPa.	Loc: Release Point 4 Proc: WSOH 10, 6.13.2.1	Also tracked on Sys 6 (60011)	x	
28	70051	12/01	S/W: Observer flight termination below 400hPa.	Loc: Midway between shelter & Rel Pt 4 (high winds) Proc: WSOH 10, 6.13.2.1	Also tracked on Sys 6 (60051) Used manual release detection on both systems for Test 30	x	
29	70131 70132 70133 70141	12/09	S/W: Multiple releases on the same ascension.	Loc: Release Point 6 Proc: WSOH 10, 6.13.2.1	Also tracked on Sys 6 (60123) 70131, 70132, 60121, 60122 were unsuccessful releases for Test 29. 70141 (and 60131) was the 4th release for Test 29		x
30	70051	12/01	S/W: Manual release detection.	Same as Test 28	Same as Test 28	x	
31	70031	11/26	Same as Test 23	Same as Test 23	Also tracked on Sys 6 (60031)	x	

Test #	OPS24 FLT #	Date	Test Objective	Release Location/Procedure	Other Test Factors	TP Used Y	TP Used N
32	70061	12/02	Same as Test 23 (failed to induce RWS termination below 70hPa for Test 24/25)	Loc: Release Point 1 Proc: WSOH 10, 6.13.2.1		x	
33	70071	12/02	Same as Test 23 (failed to induce RWS termination below 70hPa for Test 24/25)	Loc: Release Point 1 Proc: WSOH 10, 6.13.2.1	Also tracked on Sys 6 (60061)	x	
34	70081	12/03	Same as Test 23	Loc: Release Point 1 Proc: WSOH 10, 6.13.2.1	Also tracked on Sys 6 (60071) for NWS SIR validation	x	
35	70101	12/05	Same as Test 23	Loc: Release Point 1 Proc: WSOH 10, 6.13.2.1	Also tracked on Sys 6 (60091)		x
36	70111	12/08	Sys 7: After release detected, turn off main power to TRS; track flight with TRS on UPS until flight goes above 400hPa, then restore main power; test observer's ability to control antenna from RWS while TRS on UPS and after main power restored.	Loc: Release Point 1 Proc: WSOH 10, 6.13.2.1	Also tracked on Sys 6 (60101) Sys 7 Test Results: After TRS switched to UPS, observer able to move antenna on first try, but not again until ~ 10 mins after main power restored to TRS. While TRS on UPS, no GPS.		x
37	70121	12/08	Sys 7: Observer set flight termination pressure in pre-flight Administrative Display; test s/w response.	Loc: Release Point 1 Proc: WSOH 10, 6.13.2.1	Also tracked on Sys 6 (60111) Sys 7: RWS responded as expected to pre-set termination		x
38	70141	12/09	Same as Test 23 (4th release for Test 29)	Loc: Release Point 6 Proc: WSOH 10, 6.13.2.1	Also tracked on Sys 6 (60131)		x

System Issue Reports Written for ST Phase 0.1

Hardware SIRs

     1891, P2, h/w: Unable to move Antenna beyond 90.5 degrees
     1892, P2, h/w: Problem with TRS LRU
     1894, P2, h/w: TRS Display shows antenna movement before TRS initialization
     1905, P2, h/w: SPS Unable to Initialize
     1907, P2, h/w: TRS Failed To Respond To Observer's Commands
     1908, P2, h/w: Problem locking onto a radiosonde
     1966, P2, h/w: System 6 SPS Failed to Initialize
     1983, P2, h/w: Loss of TRS Control After Release & Other Anomalies
     2000, P3, h/w: On/off indicator on external hard drive

Software SIRs

     1854, P2, s/w: Begin/End Missing Temperature Levels not Coded
     1855, P2, s/w: Check Messages for Same Begin/End Time
     1856, P2, s/w: RADAT Message
     1857, P2, s/w: Unable to Mark Data
     1858, P3, s/w: Marked Data - PDS Blank
     1859, P2, s/w: SIRs 1838 & 1847 not Working
     1860, P3, s/w: Begin/End Missing RH Levels not Plotted
     1861, P2, s/w: 30 sec Rejected RH Data not Interpolated in PDS
     1870, P2, s/w: No PTU Level Within 20 mb Off Surface Selected
     1872, P2, s/w: All Required WMO Coded Levels not Selected
     1873, P2, s/w: Wind Level Selection Too Sensitive
     1884, P2, s/w: Significant RH Levels not Selected
     1885, P3, s/w: All flight summary reports are saved with the same name
     1886, P2, s/w: Could not write backup files to another medium
     1887, P4, s/w: Incorrect min/max range on Observer Initial error message
     1888, P4, s/w: Inline simulator TRS Reset button does not work
     1889, P4, s/w: Windows shortcuts don't work
     1890, P3, s/w: RWS Starts with TRS UPS in Smart Trim mode (repeat of 1821)
     1897, P4, s/w: Hardware Status Display has a green check when TRS reset is clicked
     1898, P3, s/w: Unable to edit user comments in Status Messages display
     1899, P3, s/w: Unable to change the date to year 2000
     1900, P2, s/w: Missing mandatory pressure level check message is not generated
     1901, P3, s/w: Windows shortcuts don't work
     1902, P2, s/w: Release point height not used in WMO levels
     1903, P2, s/w: Not all freezing levels selected
     1904, P2, s/w: Antenna Unable to Track
     1905, P2, s/w: SPS Unable to Initialize
     1906, P2, s/w: Check message - "No tropopause found at 500 MB or above" was not displayed
     1909, P2, s/w: Early Detection of Release
     1910, P3, s/w: Overlay previous flight error
     1911, P2, s/w: Excessively Smoothed RH Data

1912, P3, s/w: Missing vs Rejected Data for Termination Reason
1913, P2, s/w: Required check message not displayed
1914, P2, s/w: Sig Temperature Level Selection Too Sensitive
1915, P2, s/w: Fifteen seconds missing time stamp
1916, P2, s/w: Termination Pressure Discrepancy
1917, P4, s/w: XDP-1118.mal file worked differently with Test #430e
1918, P2, s/w: Wind Shear Calculation Incorrect
1919, P3, s/w: Need Automated RH Spike Removal
1920, P2, s/w: RH of 0.0% Beyond Physical Limits
1921, P2, s/w: Quantity of Check Messages Changed While In Rework
1922, P2, s/w: Duplicate Pressure Levels in WMO Coded Messages
1923, P2, s/w: Descending/Reascending Levels not in WMO Levels Table
1924, P2, s/w: Raw vs Processed RH not in Agreement
1925, P2, s/w: DDL file is not a valid Windows image on Rework
1926, P2, s/w: Overlay of RH Levels That Don't Exist
1928, P2, s/w: Surface Winds Error
1929, P2, s/w: RWS Did Not Accept Update of Station Data For New Release Location
1930, P3, s/w: RWS Did Not Generate a Status Message When UPS Turned Off
1931, P3, s/w: 'Total Wind Interval' Data Not Reported Correctly In Flight Summary
1932, P2, s/w: Noise in Temperature Data Not Removed
1933, P2, s/w: PDS RH Not in Agreement With Raw RH
1934, P3, s/w: Radiosonde Serial Number Not Displayed in Preflight Equipment Display
1935, P2, s/w: Opening Flight in Rework Changes Original Flight Data
1936, P4, s/w: Print Screen Command Doesn't Work (0.0.0.62)
1938, P2, s/w: Two Systems, Same Flight, Different RADAT messages
1939, P2, s/w: Possible Dry Bias with RH Sensor
1940, P2, s/w: RADAT Not Showing All Freezing Levels
1941, P3, s/w: System 6: Excessive Communication with External Drive
1942, P2, s/w: Observer unable to control TRS antenna while on battery power
1943, P2, s/w: GPS data not displayed, but winds are being processed
1944, P2, s/w: Processed Pressure lags when TRS operating battery power
1945, P2, s/w: Superadiabatic Lapse Rates for a secured radiosonde
1946, P2, s/w: Expected check messages were not displayed
1947, P2, s/w: RWS Specs Not Met for Search Function
1948, P2, s/w: Not All Freezing Levels Selected
1951, P2, s/w: Full Search Mode Appeared Not To Work
1952, P2, s/w: Sig Temps, RH, Winds Missing Below 400 mb
1953, P2, s/w: RADAT Missing When There was a 0° C Crossing
1954, P2, s/w: Multiple Surface Levels in WMO Levels Table
1955, P2, s/w: No Decending Level in WMO Levels Table
1956, P2, s/w: Rework: Sig Lvl Deleted in WMO Levels Table But Still Coded in TTBB
1959, P2, s/w: No PTU Level Selected Off Surface
1960, P2, s/w: Received Tabular Data is under the Process Tool Bar
1962, P2, s/w: Doing a TRS Reset is not identified in the Status Message Display
1963, P2, s/w: Rework: Adding Level via PDS Generated Errors in Levels & TTBB
1964, P2, s/w: Check Message for Super at Wrong Level
1965, P2, s/w: Wind Check Message Useless
1967, P2, s/w: Duplicate/Increasing Levels With Descending Balloon
1968, P3, s/w: Rework Duplicated 'Descending balloon' Status Msgs

1970, P2, s/w: Sfc Pressure Discrepancy Between PDS/PTU and WMO Levels
1971, P2, s/w: Termination Level & Minimum Temperature Discrepancies
1972, P2, s/w: Tropopause Not In Flight Summary
1973, P4, s/w: Wind Level Reporting Criteria
1974, P2, s/w: Mean Winds Not In Flight Summary
1975, P4, s/w: Rounding of Data for Coded Messages
1976, P3, s/w: Inconsistent Decimal Formatting in WMO Levels File
1984, P2, s/w: Increasing Pressure in 2nd Row of WMO Levels
1985, P2, s/w: One Flight, Two Systems, Different Check Messages
1991, P2, s/w: Observer insert levels feature during des/reas balloon
1992, P2, s/w: Observer insert levels feature during levels of missing temperature
1993, P2, s/w: Operator can insert duplicate WMO levels
1994, P2, s/w: User insertion of level higher than Term level
1995, P2, s/w: Max wind coding below 500 mb now possible?
1996, P2, s/w: WMO level overlay mark not on PDS or raw data plot
1997, P2, s/w: No level selected within 20 mb of surface
1998, P3, s/w: Rework Flights Older Than 6 Hours: 'Last Coded' Doesn't Do Anything
1999, P2, s/w: Missing data totals not in flight summary

RRS ST Phase 0.1 Flight Summary
November 24 - December 19, 2003
RRS System 7 (Primary System)

System #: 69990 Dome/TRS #: 2/0007												
Load 1.0.3.1												
SR&DC FLIGHT #	**ASC /REL #**	**Date**	**Rel. Time (UTC)**	**Valid Yes/No**	**Reached 400 hPa**	**Reached 10 hPa**	**Term hPa**	**Term Alt**	**Term Range**	**Flight Time**	**RWS SW Term Reason**	**Operator Term Reason**	**Comments Test Procedure Used**
1559	1	112403	1820	N	Y	N	86.94	17213	120027	57.47	13		403
1560	2	112503	1509	Y	Y	N	11.45	29881	113620	93.68	1		403
1561	3	112603	1404	Y	Y	N	14.89	28194	133237	91.8	11		403
1562	4	120103	1418	N	Y	N	60.14	19454	136427	65.98	13		403
1563	5	120103	1821	N	N	N	417.72	6935	50934	25.42	13		403
1564	6	120203	1638	Y	Y	N	17.04	27460	151573	89.15	11		403
1565	7	120203	1947	Y	Y	N	62.50	19116	159409	69.23	9		403
1566	8	120303	1609	Y	Y	N	10.46	30565	116258	96.32	1		403
1568	9	120403	1542	N	N	N	754.97	2488	4321	9.98	9		EARLY TERM
1572	10	120503	1438	Y	Y	N	11.04	30191	89447	88.42	3	1	TEST #35
1575	11	120803	1515	Y	Y	N	13.72	28718	111951	103.33	9	9	403
1576	12	120803	1833	N	Y	N	44.0	21294	109945	79.12	13	13	Test # 37
1577	13-1	120903	1540	N	N	N	1013.5	90.72	23.76	6.48	9	9	TEST # 28
2577	13-2	120903	1552	N	N	N	1013.6	89.64	23.76	6.48	9	9	TEST # 28

SR&DC FLIGHT #	ASC /REL #	Date	Rel. Time (UTC)	Valid Yes/No	Reached 400 hPa	Reached 10 hPa	Term hPa	Term Alt	Term Range	Flight Time	RWS SW Term Reason	Operator Term Reason	Comments Test Procedure Used
3577	13-3	120903	1604	N	N	N	1013.6	88	18	6.48	9	9	TEST # 28
1579	14	120903	1625	Y	Y	N	12.98	29137	127084	104.57	11	11	TEST # 28
System #: 69990 Dome/TRS #: 2/0007													
Load 0.0.0.62													
1578	15-1	121003	1427	Y	N	N	1008.5	87.19	139.41	6.48	9	9	TEST # 10
2578	15-2	121003	1444	Y	Y	Y	9.39	31203	93625	100.87	3	3	TEST # 10
1580	16	121103	1439	Y	Y	Y	8.58	31811	74977	99.87	3	3	TEST # 15
1581	17	121203	1601	Y	Y	Y	8.37	31914	155485	112.9	3	3	N/A
1583	18	121503	1422	Y	N	N	505.98	5406	7779	20.23	11	9	N/A
1584	19	121503	1721	Y	Y	Y	7.72	32467	149859	113.97	3	1	N/A
1585	20	121603	1406	Y	Y	N	10.32	30541	123349	103.08	3	3	
1586	21	121603	1821	Y	Y	Y	8.55	31689	152368	112.58	3	3	
1587	22	121703	1435	Y	Y	Y	9.36	31127	197947	117.92	1	1	
1589	23	121803	1627	Y	Y	N	20.81	25994	92769	93.32	3	3	
1590	24	121903	1358	Y	Y	N	11.44	29795	59781	103.78	3	3	
1591	25	121903	1805	Y	Y	Y	6.45	33551	63930	110.85	3	3	

Notes: Termination Reason: 1 = Balloon Burst
                             3 = Leaking or Floating balloon
                             6 = RWS-Unknown Failure, Recovery
                             9 = Excessive Missing Data
                             11= Excessive Missing Temperature Data
                             13 = User Selected to Terminate

ATTACHMENT 6

RRS ST Phase 0.1 Flight Summary
November 24 - December 19, 2003
RRS System 6 (Secondary System)

System #: 69991 Dome/TRS #: 1/0006														

Load 1.0.3.1

SR&DC FLIGHT #	ASC /REL #	Date	Release Time (UTC)	Valid Yes/No	Reached 400 hPa	Reached 10 hPa	Term hPa	Term Alt	Term Range	Flight Time	RWS SW Term Reason	Operator Term Reason	SIR #	Comments Test Procedure Used
1559	1	112403	1820	Y	Y	Y	9.55	31075	140362	94.92	3			403
1560	2	112503	1509	Y	Y	N	11.43	29888	11367	93.70	1			403
1561	3	112603	1404	Y	Y	N	14:32	28439	133507	92.42	11			403
1562	4	120103	1418	Y	Y	Y	8.34	32067	133070	100.10	1			403
1563	5	120103	1821	Y	Y	N	11.29	30114	156210	99.05	11			403
1565	6	120203	1947	Y	Y	N	62.59	19105	159427	69.20	9			403

System #: 69991 Dome/TRS #: 1/0006														

Load 0.0.0.62

SR&DC FLIGHT #	ASC /REL #	Date	Release Time (UTC)	Valid Yes/No	Reached 400 hPa	Reached 10 hPa	Term hPa	Term Alt	Term Range	Flight Time	RWS SW Term Reason	Operator Term Reason	SIR #	Comments Test Procedure Used
1566	7	120303	1609	Y	Y	N	10.46	30568	116258	96.32	1			DJ SIR VALIDATION
1570	8	120403	1916	N	Y	N	86.2	17059	93416	63.95	9			EARLY TERM
1572	9	120503	1438	Y	Y	N	11.04	30190	89469	88.42	3	1		TEST #35
1575	10	120803	1515	Y	Y	N	13.72	28716	111954	103.35	9	9		403
1576	11	120803	1833	Y	Y	Y	8.52	31779	118678	108.18	1	1		403
1577	12	120903	1540	N	N	N	1013.6	92.09	23.76	6.48	9	9		TEST # 28

2577	12-2	120903	1552	N	N	N	1013.7	88.38	21.40	6.48	9	9		TEST # 28
3577	12-3	120903	1604	N	N	N	1013.6	89.97	17.81	6.48	9	9		TEST # 28
1579	13	120903	1625	Y	Y	N	12.53	29363	127273	105.13	9	9		TEST # 28
1578	14	121003	1427	Y	N	N	1008.2	93.91	140	6.48	9	9		403
2578	14-2	121003	1444	Y	Y	Y	9.4	31193	93623	100.88	3	3		403
1581	15	121203	1600	Y	Y	Y	8.36	31919	155480	112.95	3	3		N/A
1585	16	121603	1406	Y	Y	N	10.31	30543	123355	103.08	3	3		N/A
1586	17	121603	1821	Y	Y	Y	8.54	31697	152372	112.60	3	3		N/A
1587	18	121703	1435	Y	Y	Y	9.37	31127	197948	117.9	1	1		N/A
1588	19	121703	1806	Y	Y	Y	9.85	30876	180116	102.90	11	11		N/A
1589	20	121803	1627	Y	Y	N	20.82	25997	92765	93.32	3	3		N/A
1590	21	121903	1358	Y	Y	N	11.44	29794	59786	103.78	3	3		N/A
1591	22	121903	1805	N	Y	Y	7.77	32335	64852	107.83	13	13		N/A

Notes: Termination Reason: 1 = Balloon Burst
3 = Leaking or Floating balloon
6 = RWS-Unknown Failure, Recovery
9 = Excessive Missing Data
11= Excessive Missing Temperature Data
13 = User Selected to Terminate